SPECIFICATION FOR

METHODS AND APPARATUS FOR CONTROLLING ELECTRIC APPLIANCES DURING REDUCED POWER CONDITIONS

Application for Utility Patent

This Application is related to
U.S. Provisional Patent Application 60/210,388
Filed June 9, 2000
and
U.S. Provisional Patent Application 60/246,700
Filed November 11, 2000

Invented by

Jay W. Gardner
9 Walker Road, Unit 6
North Andover, Massachusetts 01845

Related Applications

This application claims the benefit of U.S. Provisional Application Number 60/210,388, and U.S. Provisional Application Number 60/246,700, Methods and Apparatus for Controlling Electric Appliances During Reduced Power Conditions, Filed June 9, 2000 and November 9, 2000 respectively. The contents of which are incorporated herein by reference, in their entirety.

Background of the Invention

There are numerous systems for controlling the use of electricity from an electric utility; the intent being to avoid the surcharges or rate increases that can be imposed when usage levels exceed thresholds for more than a brief period. Predominantly, these systems use a central processor that controls the shedding or adding of electrical appliances in order to avoid exceeding the threshold for a period long enough to trigger an increase in billing rate. These systems frequently require the system to be programmed with sequences for shedding and adding loads depending on the user's priorities and preferences. Also, given that all loads are controlled by one central processor; the physical addition or removal of an appliance from the facility frequently requires a reprogramming of the sequence.

Summary of the Invention

The objective of this invention is to address the needs of a consumer running his home on a generator, these needs being based on the fact that the power source's rated capacity, or threshold, is far less forgiving than a targeted utility threshold. When a utility-defined threshold is exceeded, a consumer pays a higher rate for electricity. In the case of a generator, when the threshold is exceeded, the circuit breaker trips, and the facility is without power. The present invention addresses the user's need to maintain the facility's total load below the generator capacity and avoid the inconvenience of bringing the generator back on line after a circuit breaker trips. This is accomplished with multiple

devices, each performing independent decision processes that provide a form of artificial intelligence without the need for central control or complicated programming. The artificial intelligence simplifies the installation of the system, the process of adding or removing appliances to and from the system, and the process of changing the power source for a unit of different capacity. The word "generator" in this embodiment is used in the generic sense to refer to a limited power source including, but not limited to, a combustion engine driven generator, a fuel cell generator, or a renewable energy source such as a solar generator or wind powered generator. An additional embodiment of the invention, addresses the condition where the power from a utility generator or distributed generating facility, is lower than normal levels.

Each device in the system executes its own decision process, making the size and extent of the system dependent only on the level of control desired by the user. A home with a large generator could have a small number of such devices installed on a few of the largest appliances to avoid these large loads from turning on when the generator is near its capacity, thereby preventing these large appliances from tripping the circuit breaker. A small generator could have many such devices employed to make maximum use of the generator's limited power and ensure that most or all the appliances do not overload the generator's capacity. Given the flexibility of the system, the devices can also be used to manage utility power and eliminate high loads during those times when power is in high demand and utilities are approaching brown out conditions or having to resort to rolling black outs. The functions and decision processes of the devices in this invention create building blocks that can be used in numerous ways to custom design a power control system.

The embodiment of the invention includes one or more monitoring devices, referred to as "Generator Monitors" which measure the momentary power being used by the home or facility. These generator monitors calculate the remaining power available from the generator and then transmit this available power to the other devices in the system. Each generator monitor transmits the available power to either all or a select group of devices that control the use of electricity in the home. The other devices in the system, are either